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AUTHOR	Clayton, J. C., Jr.
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ABSTRACT

Educational Information System (EIS) is a proposed computer-based data processing system to help schools solve current educational problems more efficiently. The system would allow for more effective administrative operations in student scheduling, financial accounting, and long range planning. It would also assist school trustees and others in decision making, improve the school's ability to evaluate its educational policy, and provide the school with data to assess the strengths and weaknesses of its educational program. Such a system furnishes information that allows school administrators and faculty to be more effective in decision making and teaching, and also releases them from clerical duties so they can spend more time educating students. (Author/PA)

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INFORMATION SYSTEM FOR EDUCATIONAL POLICY AND ADMINISTRATION

J. C. Clayton, Jr.

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EA 003 148

P-4384

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J. C. Clayton, Jr.*

The RAND Corporation, Santa Monica, California

INTRODUCTION

We propose to design an innovative educational information system that allows each school to collect, process, analyze, store, and retrieve student, teacher, and administrative data using modern computer and analytical techniques. With this system, any school will be better equipped to plan and allocate its resources--both human and financial.

The benefits of such resource planning and allocation are both immediate and long range. For example, the proposed Educational Information System (EIS):

1) Allows for more effective administrative operations in such areas as accounting and fiscal matters, student scheduling, inventory control, purchasing, and long-range forecasting of goals and needs;
2) Assists school trustees, administrators, and teachers in the economics of academic decisionmaking;
3) Makes student and teacher performance data readily available for analysis of teacher effectiveness and student progress, and thus improves the school's ability to evaluate educational policy;
4) Provides the school with new sources of information for assessing what is valuable and essential within its educational program.

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ADMINISTRATIVE OPERATIONS

In the area of administrative operations, some readily solvable problems have already been successfully dealt with by local schools: 1) student scheduling, 2) grade and attendance reporting, and 3) business office and accounting procedures.

At one private school, the successful application of computer technology to the problem of student scheduling has already proven of great value, concrete proof that an independent school can solve educational problems with a "bottom up" approach. This is a superior alternative to the "top down" approach which seeks to impose rigid and doctrinaire solutions upon an educational institution.

EDUCATIONAL POLICY

School trustees and administrators are sometimes at odds on matters of educational policy because each lacks the necessary information upon which to base decisions. Such decisions often involve on-going factors that have financial as well as educational significance. One purpose of EIS is to provide information upon which intelligent decisions may be made regarding financial and academic policy. For example, the decision to change the method of presenting academic material from several small-class lectures given four times a day to, for example, a single-class lecture given to all students once a day, followed by individual conferences or small group seminars, may be based on sound principles. However, this change not only alters the number of teachers needed, but also dramatically alters the configuration of classroom buildings and the resources necessary, in addition to increasing use of the library for independent investigation by students. Failure to account for the economic ramifications of academic decisions, or the inability to forecast accurately the impact of such decisions, could waste valuable

resources and result in eventual stagnation of a school's educational program.

The success or failure of any school depends upon its ability to make decisions on the basis of the effectiveness of its teachers and to determine correctly the teachers that are most effective in stimulating various types of learning. In the future, the effectiveness of all education programs may well be determined by the quality of decisions made in this area. A school's inability to determine the capabilities of an individual teacher--what and how many students he can most effectively teach, and by what methods--would severely limit its capacity to develop significant or consistently successful educational programs. Also, unless the school can determine the most effective types of learning--educationally sound and economically viable--it will not be able to implement essential innovations.

Thus, a fundamental purpose of EIS is to establish methods whereby *teachers may be held accountable* not simply for the method of their teaching, but for the amount and quality of student learning in their classes. This type of teacher accountability upgrades the quality of teaching and makes evaluation more meaningful throughout the entire teaching profession. Furthermore, the EIS offers a far better use of teacher talents than does the present tenure system. For example, if a teacher can be as effective lecturing to 100 as to 25, it becomes educationally and economically valid to so organize his teaching schedule. On the other hand, the teacher whose greatest effectiveness is attained in small discussion groups should be used in this manner. Neither assignment should be given simply on the basis of length of service.

In other areas of evaluating educational policy, EIS determines:

1) What methods of presenting a given subject best accomplish the objectives of the school in teaching that subject?

2) What teacher/student combinations (and ratios) are most effective for teaching a given subject?

EVALUATING SCHOOL OBJECTIVES

An individual school's determination of what is valuable and essential is mandatory. Formal statements of "essence" and "value"--*the school's objectives*--determine to a great extent how students and faculty view themselves in relation to the school, and thus affect the tone and quality of life within that school.

Whenever an attempt is made to state clearly a school's objectives, conflict is inevitable. Some believe that only to the extent that objectives are measurable are they valid; others believe that those things which are measurable are of little importance. For example, some educators accept as a valid and complete goal the attainment by college-bound seniors of SAT verbal scores of 650. Others argue that such a goal is meaningless and unreliable as a measure of the quality of education that a student has received.

The fact is that some things pertinent to defining a good education are measurable, others are not. The degree to which the measurable dominates a school's objectives is a decision that each school must make. The important thing is that such a decision must be *consciously* made or the school cannot guide itself intelligently.

The EIS helps trustees, administrators, and teachers make that decision; once the objectives are determined, the EIS evaluates the school's progress in attaining its objectives. Furthermore, the classification and clarification of that which is clearly measurable helps trustees, administrators, and teachers to evaluate their school, to recognize that which is not measurable, yet nonetheless essential.

DESIGN APPROACH

Student scheduling, grade and attendance reporting, business office and accounting procedures, student/teacher record-keeping, etc., are nonacademic activities that consume valuable time and effort that could otherwise be devoted to face-to-face interaction with students, faculty, and other staff, as well as to the important functions of policy and planning. With EIS, the time now spent on such routine activities is minimized, and faculty efforts are devoted to the academically productive activities enumerated above.

The individual programs for accomplishing these goals are designed so that they feed into the EIS. The approach is to make each component modular: that is, each unit replaces another unit without affecting the whole system. For example, if at a later date the school decides to implement "flexible modular scheduling," the system allows for this new program. Likewise, if the grade reporting system at either school changes, it is not necessary to redesign the EIS.

Another design feature includes a hierarchical data structure. The information is organized into categorical levels that are relevant to user (headmaster, teacher, business office, trustee, etc.) needs. This allows optimal use of each information level for specific types of problems and levels of decisionmaking. Privacy constraints are included in the overall structure, e.g., teachers are not normally allowed access to school budgetary information, other teacher's salaries, etc.

The proposed EIS allows the school to evaluate alternate educational approaches. A typical study might be to evaluate the effectiveness of an alternate curriculum. Students are randomized under these two curriculums and their advancement measured during the time span of the two courses. The EIS can do this both by compiling grade point averages, PSAT

scores, and other achievement measurements before and after implementation of the new curriculums and by correlating various types of teacher/student information theorized to have an influence on the test scores. By present methods, it is virtually impossible for schools to study these problems separately. Time and money constraints are too great. With the proposed EIS, however, it is a straightforward matter to correlate student/teacher data. Evaluation of the school becomes an on-going process.

By collecting the desired data by computer as a byproduct of activities such as student scheduling, grade reporting, etc., the school does not incur the costs of repeatedly collecting such information. The functioning of a school improves when the administration and faculty have such data available for evaluating their own work. Fewer resources (people) are needed to manipulate, transpose, and store education data. The data are also presented in a format that allows maximum use of the information.

While solving specific day-to-day school problems, we thus create an information bank of teacher/student data that can be used by the school for making evaluation of school programs a routine *on-going process*.

SUMMARY

Education is in a state of turmoil in this country. Teaching methods have been challenged as outmoded, course content is often described as not relevant to today's problems, student testing and evaluation techniques are questionable, and planning for meaningful change is almost nonexistent at some schools. We believe that EIS can make a significant contribution to overcoming some of these problems as well as providing direction and guidance for other schools and school districts.

EIS will enable the schools to better perform their educational functions by making information available in a manner that allows the school administration and faculty to be more effective in decisionmaking and teaching. It also releases scarce and valuable time of the professional staff from many clerical duties for the more productive practices of educating students.